SUM Report No. 10

INTERDISCIPLINARY RESEARCH ON DEVELOPMENT AND THE ENVIRONMENT

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Contents

Boxes

Executive Summary

The report confirms that an interdisciplinary approach is crucial for undertaking research on development and environment, but also identifies the challenges that this involves. It discusses why to do interdisciplinary research, and identifies six determining elements in distinguishing types of research projects, which may also serve as a simple typology of IRDE (Interdisciplinary Research on Development and Environment). On the basis of lessons learned, mainly from the experience of the participants, the report lists a number of key recommendations in relation to each of the stages of a project: choice and formulation of the research issue, recruitment of the team, application for funding, data collection/fieldwork, analysis and findings, dissemination of results. It also offers key recommendations concerning assessment: of the research process, research products, and individual performance. But the report does not attempt to suggest a general blueprint of how to do 'good IRDE'. Indeed, such broad generalisations would be contrary to many of the views expressed by the participants at the workshop.

The report also addresses political issues: both how IRDE may better connect with policy-making, and also the issues of power that arise at the interface between the world of academia and of policy-making. The participants concluded that IRDE challenges the dominance of a mono-disciplinary approach in general, and of some disciplines in particular - especially those with a more positivistic and reductionist approach. It also challenges the dominance of a technocratic/bureaucratic approach to policy-making, which assumes that this consists merely of translating expert knowledge into practice, by the use of selected instruments. The report concludes that there is a need to bring about changes – both in the research arena and the policy arena, and not least at the interface between the two. Some of these are very basic, structural changes that will not be achieved easily or rapidly. Some of the necessary changes challenge deep-seated worldviews and institutional structures; and some challenge individual or collective interests.

The report provides a framework for identifying and understanding these issues, as well as making specific proposals for action. It also identifies the need for research *on* policy. It is our hope that the report may contribute towards developing a community of like-minded researchers with an interest and competence in this challenging topic.

Introduction: About the report

This report is based on discussions that took place at the International Workshop *Interdisciplinary Research on Development and the Environment (IRDE) – Methodological Issues*, organised in Hurdalsjøen, Norway from May 29-31, 2000 by the Centre for Development and the Environment (SUM), University of Oslo. The workshop was sponsored by the European Commission (INCO-DEV), with additional funding from the Research Council of Norway, and brought together a group of 20 international experts with broad experience of interdisciplinary research.

The objective of the IRDE Workshop was to improve the understanding of European and Developing Countries research teams about how interdisciplinary research in the field of development and the environment can best be undertaken, with a view to (i) maximising its scientific quality and (ii) ensuring its usefulness in development co-operation policy.

There were 6 participants from Developing Countries and 14 from European Union and Associated European states. The group included a roughly equal number of economists, other social scientists (particularly from sociology and anthropology), and natural scientists, as it was considered that the two major bridges that need to be built are between the natural and social sciences, and between economics and other social sciences (see Annex II for a list of participants).

In the workshop three major issues were discussed:

- **Planning and undertaking interdisciplinary research**. This included issues such as team-working and team leadership; and communicating across disciplinary boundaries – in relation to the choice and formulation of the research issue, data collection, fieldwork, and publication.
- **Assessing interdisciplinary research**. Academic quality: shared and conflicting criteria; how different are academic 'cultures'? Do we need, and can we establish, special criteria for assessing interdisciplinary research? Practical relevance: how can this be assessed, and ensured? Is there a conflict between the criteria of academic quality and policy relevance?
- **Connecting research and policy.** Designing research that is directly linked to

management and policy. The scope for research on policy.

As a preparation for the workshop all participants were asked to provide three short written inputs: a note on their own background (and how it relates to the topic of the workshop), a note on interdisciplinarity, and a case study. These inputs have all been drawn upon in this report. The workshop programme and mode of working was flexible and dynamic, to encourage free flow in structured discussions. The structure of this report was discussed and designed collectively at the workshop, and the draft sent to all for comment. The workshop and this report thus represent an important collective attempt to systematise experiences and reflections on the issue of interdisciplinary research related to development and the environment. The structure and organisation of the report are in keeping with this principle. Rather than simply summarising all that was said and written, the objective of this report is to systematise and analyse the challenges of interdisciplinary research, based on the shared knowledge of the participants. Thus although this workshop report is edited and produced by SUM, it is jointly authored by all workshop participants, who engaged actively in the discussions and provided illuminating case-studies from their own experience.

Structure of the report

We start by asking 'why do interdisciplinary research?' The argument of this report is that an adequate understanding of the interplay between environment and development can best be achieved by a number of disciplines in combination. The diversity of IRDE is presented in Chapter 2, where we identify the key elements in this type of research, providing the basis for a typology. In Chapter 3 we look at the different stages of the research process, and draw on experience with different cases to offer comments and advice for both those conducting interdisciplinary research and those who commission it or use it. The complex issue of assessing the quality of IRDE – both research projects and individual researchers – is addressed in Chapter 4. This relates also to the issue of power relations within academia and vis-à-vis policy-makers and funding agencies, which is the subject of Chapter 5, 'Policy and Politics'. The final chapter summarises the key conclusions of the workshop, which underpin and supplement the key recommendations contained in Chapters 3 and 4.

1. Why Do Interdisciplinary Research?

Interdisciplinary research necessarily involves crossing existing disciplinary boundaries, and therefore some degree of linking or mixing as opposed to separation. Interdisciplinary research may involve people from different disciplines working in parallel, or even in series, with little interaction between them. Or, at the other extreme, it may involve very close interaction, involving fundamental challenges and changes to the researchers involved. It is common to distinguish between three types – according to the level of ambition in terms of integration:

- *Multi-disciplinary*: autonomy of the different disciplines; does not lead to changes in the existing disciplinary and theoretical structures.
- *Inter-disciplinary*: formulation of a uniform, discipline-transcending terminology or common methodology; cooperation within a common framework shared by the disciplines involved.
- *Trans-disciplinary* (also known as cross-disciplinary): research based on a common theoretical understanding and accompanied by a mutual interpenetration of disciplinary epistemologies (McNeill 1999, after OECD 1972).

Although there may be several different reasons for crossing disciplinary boundaries, the most common explanation – certainly in the case of interdisciplinary research in development and environment (IRDE) - is *instrumental*. In other words IRDE is a means to an end.

In studying the environment, disciplines from a number of the natural sciences need to be drawn upon. But an adequate understanding of the interplay between humans and their natural environment requires specialised knowledge and insights from the social sciences. This is especially the case when moving from research to policy. Economics has a long-established role here, but disciplines concerned with social behaviour in all its diversity are equally important. There may arise quite fundamental differences of approach between these disciplines, not least when they are seeking to find a solution to a problem, for the very definition of the problem tends to vary according to the perspective: What is the

problem? For whom is it a problem? Issues soon become political, and the varying power and status of different actors is a question which has to be addressed. The issue of IRDE raises some rather basic questions about the role of researchers, and the place that knowledge plays in policy-making: Who generates knowledge, and how is it legitimised?

Interdisciplinary research can contribute challenging perspectives, as it allows a problem to be studied from different angles. The motivation for conducting interdisciplinary research is very often interest in a problem rather than in a discipline. Interdisciplinary research has a strong capacity to embrace diversity. As problems become increasingly complex and intertwined, the need to cooperate across the borders of disciplines becomes essential (see **Box 1** on ecosystem complexity).

Box 1: Ecosystem complexity

A variety of ecosystem processes is critical to the sustained functioning of ecosystems. Four keys issues relate to the functioning of ecosystems – from a purely ecological-biological perspective.

- First, ecological processes operate over a range of spatial and temporal scales; scales of time and space appropriate for the study or management of one process may not be the same for other processes.
- Second, ecosystem functioning depends on ecosystem structure, complexity, and diversity; such complexity underlies the complexity of ecosystem function, imparts both resistance to and resilience from disturbances, provides long-term capacity for adaptation, and is a sensitive indicator of environmental change.
- Third, ecosystems are dynamic in time and space; change is the normal course of events for ecosystems. Natural or human-caused disturbance, or interactions, on landscapes creates a patchwork mosaic, and the resulting changes initiated within each patch are influenced by the pattern and behaviour of surrounding patches. This landscape variation heavily influences ecosystem functioning at large spatial scales.
- Fourth, uncertainty and surprise are inevitable. There is much we do not understand about ecosystems. Some of that ignorance will yield to increased knowledge, but the complexity and interactions of non-linear processes promise that certain elements of ecosystems function will always be difficult to predict and that surprises in ecosystem behaviour are inevitable.

Source: Dhillion, S. 2000. Interdisciplinary Research Needs in Ecology-Biology. In *IRDE Workshop: Short notes on interdisciplinarity.*

Disciplinary boundaries are not necessarily rigid, and there is a certain amount of fluidity, making possible cross-fertilisation among them. This is how new disciplines or fields of enquiry are developed. This being said, it is also the case that some disciplines are more prone or open to interdisciplinarity than others, and, in many cases, research is not really

interdisciplinary, but rather one discipline looking at a topic more usually studied by others.

Two basic metaphors are often used in analysing the concept of interdisciplinarity: 'bridge building' and 'restructuring'. The nature of both bridge-building and restructuring will differ according to the 'scope', that is, the number of disciplines involved and the 'distance' between them. If two disciplines are closely related, there may seem little point in building bridges between them, or little likelihood of a restructuring arising out of interaction (e.g. between anthropology and sociology); while if they are far apart it may be impossible, or pointless, to build a bridge between them, and no chance of restructuring (e.g. linguistics and chemistry).

The most well-established, though still controversial, way of dividing disciplines is between the 'hard' and 'soft' sciences. To the extent that a central defining feature exists it is perhaps the reductionist nature of the former. A second common distinction is between 'pure' and 'applied' sciences. Taken together with the hard/soft distinction, this yields a two-by-two matrix into which disciplines may be classified, as indicated by the examples in the table below.

Disciplines	Hard	Hard/soft*	Soft
Pure	physics mathematics	geography biology	history modern languages sociology
Pure/applied*	chemistry	mech. engineering economics	law
Applied	pharmacy		

*on the borderline

Source: McNeill 1999, after Becher (1989).

Analysis of the problem from different disciplinary and yet complementary angles becomes then the methodological core of interdisciplinary research. The problem should set the

bounds for the relevance of the methodologies to be employed. Interdisciplinary research should allow some flexibility in the determination of research methodologies.[1]

In the field of development and the environment, as in both development studies and environmental studies, the complexity of the problems at hand calls for an interdisciplinary approach. It is widely agreed today that the challenges to development are more than just economic, and that the problem of environmental degradation is social as much as physical. A link has been made between environmental and development problems in the developing countries, following the global discourse of sustainable development for the past 15 years. To understand the human-nature interaction we need the contribution of several disciplines, not only separately but also in a comprehensive, integrative manner. This is what makes IRDE so highly relevant to policy.

Many scientists have made interesting contributions to the understanding of particular problems through adopting ideas from several disciplines or by co-operating with colleagues across disciplines. A research project from the Agricultural University of Wageningen provides an example of one such case where co-operation has led to significant breakthroughs (see **Box 2**). The point made is that many 'development-related' problems require interdisciplinary efforts to understand and resolve them. Developing networks of scholars (within and between universities and research centres) who can approach a problem from different angles is thus important. This is where interdisciplinary work is obviously of great value, whether undertaken by a team of researchers from different disciplines or by a single researcher who has knowledge or training in two or more disciplines.

[1] Diallo, M.I 2000. Interdisciplinary research on development and environment: methodological issues. In *IRDE Workshop: Short notes on interdisciplinarity.*

Box 2: The search for the cause of a disease

In Malawi a few years ago there was an outbreak of a debilitating sickness often leading to total paralysis and in some cases death. The medical people struggled to diagnose it and make sense of its causes. This led to the mobilisation of nutritionists and anthropologists at the Agricultural University of Wageningen who decided to examine the incidence of the disease in relation to the dietary habits of the sufferers. This quickly resulted in the discovery that sufferers were mostly among the urban poor whose basic staple was cassava flour. When samples of the flour were analysed, it was discovered that it contained a very high arsenic content - much higher than is usually the case for cassava processed by rural people for their own consumption and local exchange. This in turn led to the study of the sources of cassava flour marketed in the urban areas and eventually to a detailed examination of its cultivation, processing and distribution, both commercial and otherwise. The levels of urban demand and rural supply for the staple were also researched, thus giving an economic dimension to the problem.

The general conclusion reached was that the rural producers who prepared the cassava flour for sale in urban markets were taking shortcuts in processing, which normally requires paring off a sizeable layer of the tuber, soaking it for some days to remove the potassium content and then drying it out before pounding it into flour. In an attempt to reduce the labour inputs required (family labour being scarce because of migration) and to get the product on the market quickly, the soaking stage was being serious curtailed. The consequence was that the flour marketed had too high a potassium content, which poisoned those who consumed it. On the basis of this collaborative effort, measures could now be taken to ensure its proper processing and to identify the concatenation of factors affecting the particular households that had cut short their processing methods. At this point a number of policy options had to be considered as to how exactly to influence rural producers to take the necessary care in processing.

Source: Long, N. 2000. A note on interdisciplinary issues from a Wageningen perspective. In *IRDE Workshop: Short notes on interdisciplinarity.*

The Wageningen experience is that the best work of this kind is often done by researchers who bridge the social and technical divide by having an education in natural sciences supplemented by social science at postgraduate level.[2]

The applied and problem-oriented qualities of IRDE open up for 'soft' data and qualitative analysis, just as in some social science disciplines. Interdisciplinary research has more problems with its identity, though, and is in a poor position to defend boundaries. The ambition of being problem-focused and not to manifest a specific academic discipline offers flexibility but also invites intervention from various interest groups. The boundary to

[2] Long, N. 2000. A note on interdisciplinary issues from a Wageningen perspective. In *IRDE Workshop: Short notes on interdisciplinarity.*

political action is thin, and temptation for policy makers to interfere may be great.[3]

Experience shows that the outcomes of interdisciplinary research may be challenging, both to the disciplines concerned (questioning their perspectives and methodologies), and to policy-makers (questioning the way the 'problem' is defined). Taken further, these questions lead us to challenge both a reductionist disciplinary approach and a technocratic policy approach (see **Box 3**). To the extent that interdisciplinary research challenges dominant positions within academia it also introduces questions of power relations, both within academia and in relation to policy-making.

Box 3: Three approaches to 'policy'

- *Technocratic approach*: social science is sought 'applied' in much the same way as natural science is 'applied' through technology. The approach includes preparation of guidelines, manuals, methodologies (such as cost-benefit analysis) etc. The concept of the 'expert system' is at the heart of this approach; that somehow the knowledge and experience of the researcher can be distilled out in a form which makes it transferable – 'disembodied'.
- *Critical approach*: the researcher's role is seen as commenting on what others do or propose. Researchers may identify the shortcomings of proposed or actual policies; playing a critical role in a team, or conducting evaluations after the event. Or their criticism may be more fundamental, challenging the validity of the exercise as a whole – the value-laden nature of data and analysis; the possibility and validity of 'experts' deciding for others – drawing attention to the political nature of policy-making, the exercise of power, the interests of different parties, etc. They may challenge not only the expert but also the concept of expert knowledge.
- *'Populist' approach or 'citizen researchers':* this approach falls between – or perhaps even outside – the above dichotomy. This is associated with the use of techniques such as 'participatory action research', which have for many years been gaining strength in development studies. They are also becoming of increasing interest in the field of the environment, where they are associated with so-called 'civic science' or 'people's science'. This may constitute a challenge to expert opinion on such basic concepts as risk assessment.

Source: McNeill, D. 1999. *On Interdisciplinary Research.*

For these and other reasons interdisciplinary research is a high risk/high return endeavour, both in relation to the research study and to the individual researcher. A study risks falling apart, or failing to produce useful results due to failure to comply with the exigencies posed by interdisciplinarity. For a researcher, the risk refers to his or her career, which, at least

[3] Hjort-af-Ornäs, A. 2000. Perspective and design – conditions for interdisciplinary research. In *IRDE*

within academia, is generally based on mono-disciplinary academic organisational forms.

Research agendas develop, both for single disciplines and for interdisciplinary research, through the constant interaction between academic environments, policy institutions, and current events. In the case of development and environment, the role of policy-makers and funding institutions in setting up research agendas has been substantial and there are those who argue that IRDE has been mainly reactive in regard to policy-making. Agencies of international development cooperation dominated by 'donor' countries have often been involved in sponsoring research programmes related to priority issues defined by the agencies. For the most part, IRDE deals with issues that could fall under the category of 'applied research', and thus has to bear the same kind of criticisms faced by this category of research. For some researchers, the academic endeavour should not stop at understanding the problem but aim at alleviating it. This view is widespread among IRDE researchers. Equating policy-oriented research as 'not free' research is a misconception about the normativity present in any research project. There is always a reason why, or an objective we want to achieve, in conducting research. **Box 4** provides some further distinctions on types of interdisciplinary research.

Box 4: Some necessary distinctions in IRDE

- *Intra-personal versus inter-personal.* Interdisciplinary research should not be equated with interdisciplinary research *teams*. Not all inter-disciplinary research happens between people: some of the best happens within one person.
- *Self-conscious versus unselfconscious.* Are people to represent disciplines or to represent themselves, their experiences, values and insights? Hypothesis: the latter works better.
- *Salutary versus generative.* 'Countering my colleague's ignorance and crude assumptions about X', versus jointly generating new insights that transcend both starting points. Hypothesis: the latter is more fruitful but more difficult.
- *Interdisciplinary theory building vs. inter-disciplinary situation analysis*. Hypothesis: the latter is less difficult and often more important.
- *Discipline as identity versus discipline as background*. (1) My discipline/training is my allegiance (Jesuit versus Dominican), my noun-expressed identity ('I am an economist'), caste-mark, for life; versus (2) my discipline/training is one of many relevant adjectives or adjectival clauses about me ('I trained in economics 25 years ago'). Hypothesis: stance (2) is better.

Source: Gasper, D. 2000. Some general observations on interdisciplinarity. In *IRDE Workshop: Short notes on interdisciplinarity.*

Workshop: Short notes on interdisciplinarity.

It is claimed that policy-makers do not always ask the right questions about an issue. Research can contribute to bridge the gaps, formulating new and relevant questions, or perhaps questions that policy-makers do not dare to ask. When dealing with policy-oriented research, we have to be aware of the possibility that problems are defined at the bureaucratic level, having little relevance for 'local people' or those affected by policy actions, as they often are not even consulted. Interdisciplinary research can facilitate the involvement of affected groups by widening the research question and considering new dimensions to a problem. By being problem-oriented, IRDE has potential for being more participatory and democratic than other types of research. This has been demonstrated for example through the application of an actor analysis in various settings. See **Box 5** for an experience from China.

Box 5: Actor analysis

Actor analysis is a useful tool for analysing the role of development actors in development activities. It has been applied recently in natural resource management, particularly in analysing land degradation, and in formulating policy for preservation. It is a practical method to understand the complex of natural resource management with an interdisciplinary perspective, and to identify all actors involved in the development process and their multiple interests and objectives.

An actor is any person or group who has either influence or interest in the development process. Actor analysis is a tool to understand the role of actors, and particularly their interactions or interfaces (Long and Long 1992), in the development dynamics. All actors are embedded in four kinds of organisations; political, technical, religious and administrative. An actor analysis refers to three major issues; the commons shared between the different actors, their conflicts and the trade-offs. In a case study from a Tibetan community the relevant actors involved in the natural resource management process included: officials at county and township level, village leaders, technicians at county and township level, lamas, teachers, tribal head, experts, and women, men and children in the community.

Source: Xiaoyun, L. 2000. Actor analysis in natural resource management. In *IRDE Workshop: Short notes on interdisciplinarity.*

It may seem that the quest for interdisciplinarity is linked to a wish not only to understand complex societal issues and problems, but also to contribute inputs or ideas to alleviating or resolving them. It is thus not just an issue of understanding change but of understanding development. Hence interdisciplinarity is not a purely academic project.[4]

[4] Havnevik, K. 2000. Note on interdisciplinarity and key information about a relevant case study. In *IRDE Workshop: Short notes on interdisciplinarity.*

2. Types of Interdisciplinary Research: The determining elements

In this chapter we identify some determining elements of IRDE (Interdisciplinary Research on Development and Environment) and thus create the basis for a simple typology. This serves both to indicate the range of variation within IRDE, and to identify factors to be taken into account when planning or doing IRDE. It should be stressed that there is no ideal or typical IRDE model. Diversity is the rule, and research design will vary substantially according to, for example, the specific research issue. Participants at the workshop identified the following elements as central (most of them do not apply only to IRDE, but are of special importance in this type of research):

- *Origin of the project*
- *Audience for the results*
- *Organisation of the project*
- *Disciplines involved*
- *Epistemological tradition*
- *Level of ambition*

2.1 Origin

The origins of the project may, in principle, range across the whole spectrum from the *researcher-initiated* at one extreme to the *commissioned study* at the other. In practice, even when researchers take the initiative they often have to respond to guidelines from funding agencies, so that many studies fall in between these categories. Commissioned studies are usually policy-oriented, concerned with resolving specific problems, while this may or may not be the case with researcher-initiated studies.

The question of who initiates the project relates closely to who specifies 'the problem'. This influences both how the problem area is defined and which disciplines are called on to study it. Problems are defined by people with specific focus. It is important that IRDE is itself defining the agenda, not only taking pre-defined problems from policy-makers. But when applying or competing for funds there are guidelines to be followed, which means

that funding agencies often take the initiative and set the research agenda. Experience shows that most interdisciplinary development research programmes implemented 'from above' fall short of their aims and are also excessively costly.[5]

Such top-down programmes, particularly when initiated by governments, may in addition lead to tensions between researchers and the people in the study area[6] because of underlying conflicts. A bottom-up perspective is thus perceived of as most important in order to avoid possible conflicts (see **Box 6**).

Box 6: Sea Turtles in Mexico - Field of disputed values

This case of sea turtles in Mexico is an example of the failures of a top down policy process, which here resulted in the criminalising of a local economic activity which was defined as the main hindrance for conservation.

After seventeen years of bioconservation programmes, based on the insights from one discipline, biology, sea turtles are still being killed illegally in Mexico. The basis for policy must be to first assess the situation locally. In this case, too little has been done to understand the social complexity of the problem.

If policies are to be successful, there is a need for a broader perspective where international pressures, local consequences, and the needs of local people are taken into consideration. Local population groups, experts and politicians compete for the use, management and conservation of the sea turtle. It is therefore extremely important to acquire an understanding of not only the divergent interests and heterogeneity of local fishermen, retailers, and consumers of sea turtle products, but also to examine the impact of conservation policies and the intervention of biologists on these local groups.

Source: Figueroa, H.B. 2000. Sea Turtles: field of disputed values. In *IRDE Workshop: Case studies on interdisciplinarity.*

2.2 Audience

The audience for the project may be one or more of the following: other researchers, decision-makers, or 'the people' in the area studied. This will certainly affect where and how the findings are presented (see Chapter 4, 'Assessing quality'). If the audience is solely academic this may inhibit IRDE. There is undoubtedly a question of status when it comes to academic disciplines. 'Hard' is regarded more highly than 'soft', and pure more

[5] Long, N. 2000. Ibid.

[6] Throughout the report we have chosen to use the term 'local people' or simply 'people' to refer to the subjects of study in a given context. The use of such a term is not problem free, as we often find that subjects of study can be entire industrial sectors or organisations rather than 'local people' as usually in community studies. The intention is that the term refers to the local population directly affected by a particular social and/environmental problem.

highly than applied. To this one might well add: mono-disciplinary is more prestigious than interdisciplinary research. With increasing specialisation, and increasing pressure to perform – in terms of measures established by the mainstream of the discipline – it does not generally pay to be broad in one's intellectual interests (McNeill 1999).

The scope for interdisciplinarity may be greater if the audience is not academic researchers, who tend to be more critical of interdisciplinary research than those engaged in practical problem-solving. The question of who is the audience relates to that of who initiated the project, but these need not necessarily be the same.

2.3 Organisation and teamwork

A research project may be *collaborative* – with two or more researchers working in a team – or *individual.* Some claim that interdisciplinary research must, necessarily, involve more than one researcher, so that there is no such thing as individual interdisciplinary research. This report does not make such an assumption, but it is concerned mainly with collaborative research – where the issue of organisation and teamwork necessarily arises. Some argue that unless individual researchers are interdisciplinary there is no hope for teams to be so.

The type of organisation may influence the degree or type of interdisciplinarity of a research project. If there is strong hierarchical leadership, as opposed to an egalitarian structure, it is important that the research leader does not seek to impose one discipline as dominant. But at all events teamwork is of central importance in IRDE – more so than in a mono-disciplinary research team where there is a more established 'common language' and common standards. It is essential that team members are positively inclined towards interdisciplinary research, and they should preferably have long experience with inter-disciplinary research (see **Box 7** on common problems associated with interdisciplinary teamwork).

Box 7: A demand driven research programme in Mali

A research programme on poverty alleviation and capacity building experienced teamwork problems despite being initially well prepared through group discussions, sessions and workshops. The research programme consisted of five partners (teams), which included both young and old, male and female researchers from different disciplines.

It was time consuming to reach consensus as divergences between researchers were strong. There was a tendency to work and publish in parallel instead of as a group. The discipline of the senior researcher, the leader of the group, tended to emerge at any occasion, and there were regular breaks in the dialogue. Members tended to concentrate on their own duties and interests, accusing others of not following. The project ended up as being multidisciplinary instead of interdisciplinary. A constant effort was needed in order to reorient towards internal dialogue within the individual teams; bridges always seemed to be weak.

Despite the difficulties, there were also positive outcomes from the project, such as the fruitful dialogue between the researchers, and the discovery, through their different approaches, that given problems have many facets. The outcome of the research programme was of more practical value to the end users; farmers and NGOs.

Source: Diallo, M. 2000. In *IRDE Workshop: Short notes on interdisciplinarity.*

The role of the social sciences in interdisciplinary research was discussed in particular at the workshop. Some were of the opinion that the social sciences should be the links – or the 'glue'[7] - between the disciplines involved in the IRDE process. It was argued that the social sciences could have this 'glue' function both at an epistemological level and a practical level (see **Box 8**). But it was noted that being the 'glue' does not necessarily mean being the dominant discipline. It was also stated that the motivation of researchers to join IRDE projects is to be part of a group, not a 'glue'.

[7] This refers to glue as connection between disciplines, not as connection between research and policy.

Box 8: On different kinds of 'glue'

- *Institutional or administrative*: the culture provided by co-membership of a single institution, or by a common department with different disciplinary competences (eg SUM, or Anthropology at UKC, with lawyers and biologists in the same department)
- *Practical, field-oriented*: all having to share common practical problems at the level of field investigations
- *Epistemological*: shared framework for generating knowledge; in the absence of epistemological commonalties, some subjects (eg anthropology and geography because of their substantive scope and intellectual range) can provide a community-focused context through which other disciplines can inter-link
- *Ideological or moral*: shared commitment to the achievement of a specific desired objective

Source: Ellen, R.: written comment.

Box 9 presents lessons learned from a case study which through organisational efforts managed to proceed along interdisciplinary lines despite a difficult start. The incentive for collaboration in this case was the need for funding, not an inherent interest in and commitment to interdisciplinary research.

Box 9: Environmental degradation and sustainable agriculture in Tanzania

The objective of this research programme was to combine natural and social science methods in exploring how local perceptions and knowledge can contribute to the development of more sustainable methods of farming. The project was divided into three interdisciplinary sub-projects, but combining only related disciplines, and each more focused than the project as a whole. To achieve social/natural science inter-disciplinarity two cross-cutting studies were later established in which researchers from each of the sub-projects would work together on well defined questions and with joint field work planned in advance.

One clear conclusion among team researchers is that interdisciplinary research is fruitful and necessary, but it is also difficult and time consuming. The objective must be clearly defined from the start, and the problem area well delimited. It would also be a great advantage to have a pilot phase to thoroughly develop the formulation of the research question, preferably during a joint trip to the project area. There must exist a clear will to use an interdisciplinary approach and to define the individual discipline's activities, which are also important, on the basis of the joint objective. Procedures must be thought out for the interdisciplinary processes, including clarification of objectives, methods, and monitoring of implementation and reporting. Project planning must also take into consideration the different timing required by the different disciplinary activities.

Source: Boesen, J. 2000. Centre for research on sustainable agriculture in semi-arid areas in Africa. In *IRDE Workshop: Case studies on interdisciplinarity.*

2.4 Disciplines involved

Many different disciplines may be involved in IRDE, depending on the nature of the issue (and on the three dimensions mentioned above: origin, audience and organisation). The question is not only whether few or many disciplines are involved, but also *which* disciplines and how they complement and communicate with each other. Some suggest that 'close' disciplines, like for example geography and anthropology, work best together. On the other hand, cooperation may be easier when the dividing line between the partners' fields of expertise is clear than when they claim to have expert knowledge in the same area.

A discipline may be seen as a combination of a *perspective*, a set of *methods*, and a *field of study*. In order to examine how disciplines interact, it is useful to distinguish between these three dimensions, and especially to set 'perspectives' against 'fields of study'. In many cases research is not really interdisciplinary but rather one discipline looking at another discipline or field. For example environmental economics is very much economics and not interdisciplinary. Some see themselves as 'meta-disciplines' because of their inter-disciplinary character (see **Box 10**), but this may well be disputed by others.

While the centres of academic gravity for each discipline might be fairly clear, there is a broad zone of overlap. The boundaries fluctuate with power structures inside academia as well as with the strength of a particular discipline to address a specific issue. Whereas academic disciplines may be concerned with boundaries, interdisciplinary research has no border to defend. Problem perception, and not academic boundaries, is a significant feature.[8]

Any complex problem requires contribution from a range of disciplinary knowledge for its investigation and understanding. Where the need is for social science to come together with natural sciences, the existence of different frameworks, problems such as how to organise the research, to assess quality and objectivity, will emerge more forcefully. The first challenge is perhaps to identify the various disciplines required for addressing the problem at hand, and try to create a working environment where these disciplines can establish a constructive relationship to each other in investigating the problem.

[8] Hjort-af-Ornäs, A. 2000. Ibid.

Box 10: Ecology and other disciplines

Because of its interdisciplinary character, ecology has been called a meta-discipline. Ecology is the study of behaviour of organisms within complex systems composed of myriad of other organisms and their physical environments. Increasingly, this discipline has focused on how interactions among biological and physical components influence the overall functioning of ecosystems. These components are increasingly being determined by human activities. Ecologists rely on economics which can assist in the study of how we can decide which of our needs and wants we choose to satisfy given our limited resources.

Ecology must rely heavily on inputs from the other natural and social sciences. Ecologists, and perhaps economists, typically confine their attention to what people want (or utilise), rather than why people want what they want. Understanding these 'why' questions – an understanding which is crucial in designing environmental and conservation policies – is the realm of psychology, sociology, anthropology, and even of ethics and aesthetics. Also, the translation of analyses of different disciplines into practical policy requires an understanding of the political system. Of course, understanding the technology of production requires recognition of the physical, chemical, biological, and ecological constrains on production possibilities. The latter may be driven by significant sociological components.

Ecology relies heavily on the fields of physiology and genetics to provide an understanding of the basic workings of organisms. Physical sciences such as chemistry and geology provide the constructs and tools necessary to characterise the non-living portions of the environment and their interactions with biota. The social sciences have contributed quantitative methods for sampling populations and characterising variation to ecologists. In recent years, ecologists have come to understand the ubiquity and importance of historical patterns to human impacts on ecosystems and increased their collaborations with historians and historical geographers.

Source: Dhillion, S. 2000. Interdisciplinary Research Needs in Ecology-Biology. In *IRDE Workshop: Short notes on interdisciplinarity.*

The language of different disciplines makes communication very difficult. Sometimes there *appears* to be common understanding and it is not for some time that serious divergence in understanding is revealed (see **Box 13** in the next chapter). A separate but related issue is the involvement of local people. Researchers from some disciplines may be suspicious of involving local people and/or valuing their knowledge and experience.

Values and hence social negotiations are an integral part of the scientific research. What is the 'scientific truth' is not necessarily contained within the analysis of one or other discipline or theory. An interdisciplinary approach can help researchers to achieve some distance from their beliefs and assumptions.[9]

[9] Guivant, J. 2000. Brief comments on some key issues in planning and undertaking interdisciplinary research. In *IRDE Workshop: Short notes on interdisciplinarity.*

Different disciplines have developed certain ways of defining problems. Before turning to interdisciplinarity, most researchers have been trained and worked within a single discipline; there is no such thing as pre-disciplinarity. It is the approach in searching for the answer rather than the way we formulate questions that characterises interdisciplinary research and researchers; that is, the acknowledgement that other disciplines can have something to contribute in the solution of a research problem, and that together different disciplines can provide a better understanding of the problem.

2.5 Epistemological tradition[10]

Underlying the question of relations between disciplines is the more basic question of differing epistemologies, which may be contrasted as *critical/contextual* or *positivist/general.* It can be very difficult to combine researchers with these differing epistemologies in a single research project. IRDE tends to be more reflexive than most mono-disciplinary research (also more than most multidisciplinary research; see previous chapter), often adopting a critical/contextual epistemology. This contrasts with the positivist/generalist epistemology of economics.

It was noted that epistemological traditions may vary not only between disciplines, but also within them. It was suggested that disciplines have tensions with each other when they are competitive rather than complementary; thus geography does not compete much with others, but anthropology and sociology compete with each other, and economics tends to compete with all other social sciences. By contrast, when law as a discipline was mentioned no one at the workshop had anything negative to say.

Box 11 provides an example of how an epistemological divide may impede the development of IRDE.

[10] At the workshop the term "paradigmatic tradition" was mostly used in the discussion referred to above. However, based on comments on the draft from participants we have chosen to use the term "epistemological tradition" instead.

Box 11: Experience from a capacity building project in multidisciplinary environmental research

This project experienced problems both in planning and undertaking interdisciplinary research, and in connecting research and policy. The ambition was that Danish researchers and their Burkinabè colleagues should formulate and conduct multi-disciplinary environmental research jointly, by doing field work as well as publishing together. This did not work out.

The reasons are many, and include: language problems, cultural differences, different perspectives on the basic motivation for conducting research. But the most important factor has been a lack of consensus regarding fundamental environmental problems (and their causes) facing the Burkinabè society.

While research results have shown that environmental degradation and its causes are not to be perceived as linear, causal and simplistic, but rather as complex, contextual and variable, this perspective is not shared by Burkinabè colleagues. In other words, one fundamental constraint for realising a multidisciplinary perspective and approach to the analysis of environmental degradation is a contradictory view and different paradigmatic perceptions which have far-reaching theoretical, empirical – but also political repercussions.

In Burkina Faso (and maybe not only here) the notion of environmental degradation is heavily influenced by standardised and straightforward conceptualisations, where the logic presented, in research, policy and aid circles, is often running according to a schema (and a causal chain), leading from demographic pressure via poverty, pressure on the land, overgrazing, cutting in the vegetation for fuelwood needs, to reduced fallow, nutrient depletion, soil degradation – and more poverty.

This standardised view, or received wisdom, regarding environmental degradation and its causes are maintained and persist far beyond what research results might indicate. And a certain coherence is built from policy, planning and to project intervention in which possibly environmental 'myths' are gradually transformed into narratives of seemingly self-evident truths.

In addition, such knowledge systems tend to reinforce existing power relations by enabling the various actors (whether policy makers or members of the scientific community) to ensure a continued flow of external resources to their respective domains.

Source: Marcussen, H.S. 2000. ENRECA - Experience from a capacity building project in multidisciplinary environmental research. In *IRDE Workshop: Case studies on interdisciplinarity*

The apparent ability of economics to generalise and make claims to universalism, and its language and method of rational choice so appealing for some, are the main point of contention with other social scientists. One workshop participant summarised the argument as follows:[11]

- Economists are typically not trained, and often not willing, to study people as people

[11] Gasper, D.2000. Some general observations on interdisciplinarity. In *IRDE Workshop: Short notes on interdisciplinarity.*

rather than as automata. They study behaviour but ignore motivation, conceptualisation, and culture.

- They have an obsession with precision above relevance and realism; and a frequently absolutist style (which gives rhetorical advantage in policy debate).
- Other social sciences all start with a situating of their field in relation to others; economics rarely does that.
- Economists too often acquire a superiority complex with reference to other social sciences. Even those who in fact practice interdisciplinary research, learning from other sciences, can decry the notion and confuse it with the unrealistic advice that one must learn all sciences or build a single mega-science.

A more positive view, from another participant,[12] is that new institutional economics is an example of economics taking context seriously, and can even be regarded as inter-disciplinary through its origins in law, organisation theory, etc. The approach of new institutional economics to customary management of natural resources is an example: it can combine economic theorising and the use of both quantitative and qualitative materials. It was broadly agreed that the problem lies in the reductionism of standard economic inquiry: it abstracts away problems that countries face when seeking to establish and implement policies. A less reductionist approach that can make use of 'thicker' data could be a solution. Interdisciplinary research and theoretical and methodological pluralism may provide a check against the 'narrowness' of economics and provide a better basis for connecting research and policy. But it is evident that economics as a discipline has a special role when it comes to policy-making (see Chapter 5.3).

[12] Paavola, J. 2000. Connecting research and policy on environment and development: Problems and possible solutions. In *IRDE Workshop: Short notes on interdisciplinarity.*

2.6 Level of ambition for interdisciplinary integration

One may distinguish between different levels of ambition regarding interdisciplinary integration (see previous chapter for the distinction between *multidisciplinary, interdisciplinary* and *transdisciplinary* research). What one most commonly finds is an approach which involves a combination of disciplines, covering many aspects of the same issues in an overall research project. But this approach is merely additive with only slight integration of the different disciplines. At the opposite pole, we can find interdisciplinary research which assumes that there is a general theoretical framework – such as human ecology – to which the other disciplines must be subordinated.[13]

There is some, negative, correlation between level of ambition and scope: the greater the scope, the lower must be the level of ambition. From time to time the highest level of ambition – transdisciplinarity - has been an aim for researchers; and indeed an interest in interdisciplinary research has, in some cases, derived from a belief in this as a viable goal. Participants at the workshop agreed that transdisciplinarity is difficult to attain, and regarded it as a major challenge – in practice – simply to move from multi- to interdisciplinarity.

Box 12 provides an example of how high quality interdisciplinary research can be facilitated by a modest level of ambition.

[13] Guivant, J. 2000. Ibid.

Box 12: SEREIN – A multidisciplinary research initiative

The research activities in SEREIN (the Sahel-Sudan Environmental Research Initiative) are basically organised in 14 project components which are mutually interlinked with the aim of addressing multidisciplinary research challenges. Many of the project components start with precisely focused research activities, which aim at providing elementary and basic knowledge of high quality within specific scientific disciplines that are not yet well researched. This type of work will often be immediately suitable for publication in journals within its own 'narrow' field.

All mono-disciplinary works are, however, also targeted and planned to be basic elements in multidisciplinary efforts and published and used as such with the aim of fulfilling SEREIN's overall objectives. 'Land use' in the broader meaning of the term constitutes the unifying aspect that allows each of the disciplines involved to identify themselves as having significant contributions to make in order to pinpoint factors that enable or constrain the resource management strategies in the land use system. Being aware that at the end of the day a more detailed comprehension of the complex cause-and-effect relations is probably needed, it was believed that the implicit assumptions embedded in this common framework could initially guide and help to maintain a common direction of research.

To pursue these aims, different disciplines have to work in concert. SEREIN has chosen a pragmatic 'version' of pluri-disciplinarity to address land use issues – somewhat in-between 'multidisciplinarity' and 'interdisciplinarity'. This has proven useful (e.g. created insight that may otherwise have been overlooked by the individual researcher) and led to new insight in several cases.

Source: Reenberg, A. 2000. SEREIN – a multidisciplinary research centre. In *IRDE Workshop: Case studies on interdisciplinarity.*

2.7 Conclusion

The six elements described in this chapter are those which most strongly determine the likelihood of success of an IRDE project, and are therefore those which researchers should be particularly aware of when planning and undertaking such research. In practice, the extent to which researchers (and those who commission research) have the power to alter these elements will vary. In some cases, they may have to be taken as given; but in others there may be major scope for choice in how a project is planned and undertaken (see next chapter).

The six elements identified can also function as the basis for a typology – for classifying case studies, and hence for finding patterns (associations between different elements, and with the degree of success or failure of the IRDE enterprise) which may assist in analysing and evaluating IRDE.

Since this emerging typology was drawn up after the case studies of this report were conducted and presented, it is not possible to classify them on this basis, and hence establish meaningful patterns; but it is hoped that in follow-up work to this workshop it will be possible to undertake such an analysis, based on case studies selected and analysed according to a common framework. At this stage only some broad tendencies may be identified, e.g. a contrast between *researcher-initiated*, *reflexive/critical*, *inter*disciplinary research projects on the one hand, as compared to *commissioned*, *positivist*, *multi*-disciplinary research projects on the other.

Summary Table: Types of interdisciplinary research

Elements	**Alternatives**	**Key issues**
Origin:	researcher-initiated/commissioned	policy-orientation, problem-definition
Audience:	researchers/decision-makers/users	status of and scope for IRDE
Organisation:	individual/collaborative	type and degree of IRDE
Disciplines:	few/many, similar/different	complementarity and communication
Epistemology:	critical & contextual/positivist & general	communication or conflict
Ambition:	multi-/inter-/trans-disciplinarity	relates negatively to scope

3. Lessons Learned: Planning and undertaking IRDE

Interdisciplinarity may be seen as a process, a way of working, as much as an analytical approach or a thematic field. But this mode of working faces certain particular challenges and problems, concerning reflexive processes, terminology development (communication), methodological and theoretical development and approaches.[14]

When conducting IRDE there are challenges to be met and choices to be taken at every stage of the research process. In identifying lessons learned, it is useful to distinguish between the different stages of a research project, as follows:

- *Choice and formulation of the research issue*
- *Recruitment of the team*
- *Application for funding*
- *Data collection/fieldwork*
- *Analysis and findings*
- *Dissemination of results*

The process may not be strictly linear. Preliminary analysis may for instance lead to another round of fieldwork. And the ordering of some of these stages may vary (or they may run in parallel), with important implications. Below follow some key issues and recommendations discussed at the workshop on how to strengthen the interdisciplinary research process.

3.1 Choice and formulation of the research issue

The way the research issue is formulated is in itself an indication of the character of the research project. A methodology in which explicit hypotheses are set out to be empirically tested contrasts with a more open-ended approach where theories and hypotheses are developed in the field, over a period of time. The latter is generally more suited to an inter-disciplinary perspective. The way problems are perceived will influence the content and outcome of the project, and the starting point will heavily influence the conclusions of the

[14] Molteberg, E. and R. Haug 2000. Interdisciplinarity: what, how and why. In *IRDE Workshop: Short notes on interdisciplinarity.*

project. Promotion of IRDE through a strong theory propounded by one school from one discipline is less suitable than the adoption of a conceptual framework shared by the researchers of a team.

It was stressed at the workshop that *brainstorming* should be built into the project from the start, and that problem definitions and concepts in different phases of the process must be included in the discussion. Although it was agreed that there should be participation by the local people (ref. footnote 6) at an early stage, there was some disagreement as to whether this should necessarily occur right from the outset. **Box 13** provides an example of how the initial problem formulation influences the rest of the research process.

Box 13: A comparison of two case studies in Nepal and the Caribbean

The two projects referred to here were both originally envisaged as interdisciplinary and directly related to policy. They were both collaborative, and involved scientists and researchers from different schools, disciplines and institutions, and included direct participation by resource managers and government agencies responsible for resource management. Each had a 2-3 year time frame and was funded by different parts of UK government. The two projects looked quite similar and they were both about the use of natural resources by local communities. They involved local population, communities and institutes. Each has met its original objectives, but they have done this by quite different routes. The reason for this might have been the way the issue was problematised.

In many respects these two projects illustrate the difference between multidisciplinary and interdisciplinary research. In one case, team members had very different ideas about what the 'problem' was and this perception was further amplified through the research. There was little room for coordination and mutual discussions. The researchers shared fieldwork but still they ended up at different places. This was because the issue was not adequately dealt with in the very start of the project. There was too little communication initially. They did not manage to achieve IRDE.

In the other case, a long time was spent constructing a framework which could accommodate different views and disciplines and which was also acceptable to managers and policy-makers. A massive investment is needed to overcome suspicion of unfamiliar methods and especially to talk about what concepts such as 'science', 'universal' and 'bias' mean in the context of the research itself. A solid interdisciplinary framework helps.

The lessons learned from these cases is that it is necessary to spend time initially to negotiate a common framework. The common concepts are difficult to establish on the outset; they have to be negotiated during the projects. It is thus important to start with common questions but these have to be problematised and negotiated from the very beginning.

Source: Brown, K. 2000. Two case studies. In *IRDE Workshop: Case studies on interdisciplinarity.*

Key recommendation:
Keep the research design as open-ended as possible; try to avoid excluding or prejudging issues through the way in which issues are formulated.

3.2 Recruitment of the team

One of the main conclusions from the workshop is that the success of a project depends very much on the persons involved. The most successful IRDE comes from people who have worked together in teams for a long time. It is vital also to try to induct and influence mono-disciplinary researchers, and to involve and train some junior interdisciplinary researchers.

An interdisciplinary research team can work well if there is a genuine sense of participation of all members. Interdisciplinary research should be seen as a process of shared learning.[15]

Communication is an important part of interdisciplinary teamwork. One of the results which come of more teamwork and analysis is a common terminology, a sorting out of the most central of the terminological problems with which interdisciplinary work is fraught: the same term has different meanings in different disciplines, the same notion or phenomenon has different terms.

However, it must be stressed that consensus is not always a virtue, especially if it conceals real differences of viewpoint. If properly handled, disagreement may be an important part of the process of doing interdisciplinary research.

The ideal team consists of researchers from different disciplines who have successfully worked together already; or who at least have successfully worked together with others on similar studies. Academic ability should be a necessary but not sufficient condition.[16] Finally, group dynamics is not only a question of the kind of disciplines involved, but also about the individual personalities and the way these interact.

[15] Diallo, M. 2000. Ibid.
[16] Molteberg, E. and R. Haug 2000. Ibid.

Key recommendation:
Willingness and (if possible proven) ability to work in an interdisciplinary team should be a necessary criterion of selection in recruitment.

3.3 Application for funding

The interdisciplinary character of the research project may change radically according to which stage in the research process comes first. Is the team recruited before the research issue is formulated? Or is it perhaps the application for funding which determines who should be the team participants? These are issues which need to be reflected on when embarking on an interdisciplinary research project.

There is a widespread impression that there is a huge demand for IRDE from the funding institutions. The problem is that the term is defined and used in different ways. What is IRDE and how is it supposed to be undertaken? (see **Box 14**)

Box 14: Struggling with interdisciplinary work

The experience of Wageningen is similar to that of many universities. Social scientists at Wageningen, along with their economic and technical colleagues, have constantly been challenged by the central administration to adopt an interdisciplinary approach. Frequently this has been no more than rhetoric since the advantages of interdisciplinary co-operation have never effectively been clarified, beyond the need to respond to the Dutch government's strong commitment to development aid and to the policy orientations of international donors. Linked to these arguments has been the assumption that the university is more likely to survive if it demonstrates its capacity to address 'development questions' which by their very nature are multi-dimensional. The danger is that 'interdisciplinary' becomes simply a slogan for accessing funds. A bureaucratic framework for accountability and administrative control of research activities is established, but no guidelines for how to establish or promote interdisciplinary co-operation.

Source: Long, N. 2000. In *IRDE Workshop: Short notes on interdisciplinarity.*

This creates two kinds of problem. First, that a research project application claims to adopt an interdisciplinary approach without being clear as to what this is, or without a real commitment to conduct interdisciplinary research. Second, that the project is committed at

an early stage to a rigid research design (to satisfy the requirements of the funding agency), which precludes active involvement of all collaborating partners, and necessary modifications as research progresses.

The possibility that one is locked in to a project design which is unduly shaped by those financing the research, or by the lead applicant, is always a potential danger, but this is especially dangerous in the case of IRDE. The best way to avoid this is to allow for a two-phase application process; either projects should be able to apply for money for an initial period of conceptualisation, or they should be phased in two stages, where there is a real opportunity for either major modification or abandonment after stage one.

The problem with a two phase application process is that it is sometimes rather cumbersome and slow. An intermediate variant is to have an initial application and funding for an entire study, but with the design and cost of Part II indicative and the funds for Part II only ear-marked, not allocated; then after the review of Part I and the revised design and costing of Part II, Part II may or may not be approved.[17]

Key recommendation:
IRDE should be financed in two stages, to allow flexibility in project design and maximum involvement of partners.

3.4 Data collection/fieldwork

The importance of fieldwork was stressed at the workshop. It was widely agreed that the experience of doing research together is quite crucial to the success of interdisciplinary research. (Some went so far as to make this a defining criterion of IRDE – that it should necessarily involve joint fieldwork). Beyond this, however, there was reluctance to be strongly prescriptive as to how to conduct fieldwork. For example, some favoured small 'hands on' projects, as opposed to large, mega-projects planned in detail. Although funding bodies often favour the latter, it was suggested that they reduce the scope for flexibility, and that instead of becoming one integrated interdisciplinary research project, many autonomous sub-projects with few links between them may develop.

It is in the field that many of the most direct contacts between different disciplinary perspectives occur. This raises the question of the varying roles of the different researchers and disciplines, and issues such as data sharing. If researchers from some disciplinary backgrounds collect data for others, but not vice versa, this may create a subordinate relationship, leading to tensions between team members.

Key recommendation:
Research should be planned such as to maximise the extent to which researchers work together in the field.

3.5 Analysis and findings

It is essential not only to have a good problem focus but also to have a way of integrating the different findings in such a way as to improve understanding of the interrelations and weighting or significance of various social, technical, economic and material components. In respect to development questions, the binding element is people, and their livelihoods and resources. It is likely therefore that social science will be called upon to play an important role in developing such integrating frameworks.[18]

It will often not be possible to fully resolve the conceptual and methodological problems of an interdisciplinary project at the very outset of the study. In keeping with the approach already recommended, most of these will have to be resolved in the course of the study, as fieldwork progresses. But the process – of methodological and conceptual discussion – should begin very early, and as far as possible a shared 'language' and set of concepts should be established.

The involvement of both local people (ref. footnote 6) and decision-makers does not replace academic discussion, but may constitute both a challenge and an opportunity for researchers. The former have a specialised knowledge which should be called upon, and which may well differ from received wisdom.

[17] Comment by Des Gasper.
[18] Long, N. 2000. Ibid.

Box 15 gives an example of how an interdisciplinary approach may result in a more relevant and comprehensive collection of data, which again leads to a more detailed and nuanced analysis.

Box 15: Water and soil pollution caused by animal manure in Southern Brazil

The starting point of this research project is that agricultural pollution and its control is not susceptible to a mere technical solution but requires an analysis of the way the conflicts and convergencies on their nature, causes and extension are negotiated between the different social actors involved in the situation.

The focus of this research project has been on how the environmental question presents itself to different actors and at different stages, and interviews have been made with employees from the agroindustries, farmers, farmer unions representatives, researchers, etc., to see how each considered the environmental problem and how they define the role of others.

The agroindustries argue that they are doing all they can to avoid pollution, but they do not assume responsibility for what is happening in the contract farms. If somebody is to be blamed, the consensus point of view is that it is the farmers who are not adopting the recommended practices.

The construction of the deposits presents many problems: the most important of which is that technically they are only a form of storage. Data of water quality were analysed in the areas where swine concentration is most significant and demonstrated the high levels of pollution. The project has also identified how the agroindustries 'translate' the interests of a significant part of the regional population, having the authority to speak on behalf of other social actors (farmers, farmers associations, urban population and also researchers), without being questioned.

The interdisciplinary methodology adopted in the research project has enabled the researchers to show that neither the causes nor the consequences of the manure pollution have been really solved. The situation may even be worse now, because the impression that a solution has been implemented prevents a recognition of the way pollution is actually increasing as the corn fields which could absorb the manure are no longer sufficient for the increased pig production.

Source: Guivant, J. 2000. A case study. In *IRDE Workshop: Case studies on interdisciplinarity.*

As noted above, IRDE is a high risk/high return activity. The fieldwork and analysis may be more time-consuming than mono-disciplinary research, and the findings more challenging.

Key recommendation:
Allow long time for the study, and build in regular meetings for review of methods and concepts.

3.6 Dissemination of results

The potential audience for research results may, as noted earlier, be other researchers, decision-makers or the people in the area studied. Traditionally, the main way of disseminating research results is through publication in journals, monographs or edited volumes. In the case of IRDE this presents special challenges which are the subject of the next chapter. It should be noted, however, that there are other means of dissemination – which are likely to be of more value for decision-makers and the lay audience. Here the form and content of presentation of results will be very different. This issue is also discussed in the next chapter.

Key recommendation:
Make separate plans for publication for an academic audience and other forms of dissemination, and distinguish clearly between the requirements of each.

Summary Table: Planning and undertaking IRDE

Stages in the research project:	**Key recommendations**
Choice/formulation of research issue:	Open-ended approach
Recruitment of the team:	Good teamwork spirit and communication
Application for funding:	A two-phase application process
Data collection/fieldwork:	Joint fieldwork
Analysis and findings:	Continuous review of methods and concepts
Dissemination of results:	Distinguish between audiences

4. Assessing Quality in Interdisciplinary Research

Who is to judge the quality of interdisciplinary research, and by what criteria? It is a truism that research should be of high quality. This applies equally to IRDE as to mono-disciplinary research, but quality assessment is often more controversial in the latter case, where there is a need to assess processes and results based in various academic disciplines. Standards of rigour and judgements of what methodology is appropriate may vary between different disciplines, a fact that raises problems for those attempting to bridge disciplines. Similar considerations apply to the issue of originality. What is novel to the historian may not be so to the anthropologist – and vice versa. In each discipline, there is established a sense of what constitutes the core body of knowledge at any given time. Should a piece of interdisciplinary research be based on the most up-to-date literature in both (or all) the disciplines concerned? In addition, due to the policy-orientation often present in IRDE, the criterion of (social) relevance may be more strongly applied.

For interdisciplinary research, the common knowledge base required is not usually well-defined. And this is a central dilemma. But to build up a community of researchers, sharing a common language and body of knowledge, is a long and sometimes difficult process (McNeill 1999). Does one need some specific criteria to assess IRDE? It should be recognised that different disciplines have different criteria for assessing quality. This does not imply, however, that all these criteria *plus* the IRDE-specific (if it exists) should apply when assessing the quality of IRDE. Even leaving aside the question of relevance, there is a danger of '*double jeopardy':* that higher standards are set for IRDE than for mono-disciplinary research, because it is expected to excel according to two separate quality requirements.

The alternative to *double* – or perhaps *multiple – jeopardy* should not be an evasion of rigorous standards but an insistence that here rigour consists in (1) dealing with the major factors affecting a case, to the degree of detail required for sufficient precision for the purposes of the study; and (2) not ignoring many major factors and arbitrarily focusing on just one or a few to a degree of apparent high precision (often spurious, given interactions with the other factors) dictated by disciplinary habits rather than by the requirements of

making sense of the particular case studied.[19]

This chapter is concerned both with the assessment of research *ex ante* (proposals for funding) and *ex post* (research output). Assessment of quality of interdisciplinary projects should relate not only to the *products* of IRDE, but also to the different stages of the research *process*. The formulation of research issues might not be the outcome of hypotheses but of interaction during the research process. This means that research problems might be identified after writing an application, not before. Similarly, assessment should be made not only of the *individual performance* of the people involved in the research (this applies especially to doctoral students) but also of the *institution(s)* undertaking the research.

4.1 Establishing assessment teams for IRDE

The assessment of both research proposals and products will generally be undertaken by a group of researchers. The findings of such a group will necessarily be strongly influenced not only by the criteria for assessment but also the composition of the group. In the case of IRDE it is most important that the criteria for assessment explicitly promote inter-disciplinarity, and that the group is not simply composed of researchers from different disciplines, but researchers who are knowledgeable in IRDE. Established in their respective disciplines, referees of IRDE projects have also varied views as to what is inter-disciplinarity. Since this is a relatively new issue, it may not always be possible to find researchers who have long experience with IRDE, but they should at the very least have a positive attitude towards, and some proven competence in, working with other disciplines.

Teams established for assessing quality for IRDE projects must be interdisciplinary (not just multidisciplinary) committees, recruited from different disciplines. Although quality assessment often requires review from mono-disciplinary specialists, it is desirable that the leadership and typically the majority of the assessors should be interdisciplinary**.**

[19] Comment by Des Gasper.

Key recommendation:
Those assessing IRDE should have proven competence not simply in one of the appropriate disciplines, but in interdisciplinary research as such.

4.2 Assessing the research process

In addition to the usual criteria, assessment of IRDE proposals should include 'process' criteria, i.e. an assessment of the way in which the research process is planned, which will indicate whether the researchers are aware of the challenges that IRDE poses.

As noted, in IRDE there is a greater need for flexibility. The fact that a research process is open to (possibly major) change underway may well be a sign of good research. But funding agencies may not appreciate that projects may change considerably during the research process. IRDE is very much process oriented and this demands a kind of built-in (self) review process, which puts certain demands on the project procedures. It seems from experience that IRDE projects must have greater willingness to take risks than mono-disciplinary research processes. (As above, a two phase system could be an option). The risks involved in carrying out interdisciplinary research should be acknowledged.

Key recommendation:
The planned research process should be given emphasis in the assessment of proposals, with credit given for those which demonstrate a good understanding of how this may need to differ from a mono-disciplinary project.

4.3 Assessing research products

As noted in the previous chapter, an important part of the research process is dissemination of results in academic journals. There is a tendency for interdisciplinary journals to be regarded as having low status, and attracting less attention (sometimes this is explicitly made manifest in officially specified rankings of journals).

In mono-disciplinary research the criterion of quality is usually well defined, in relation to the established body of research in that discipline. The challenge for IRDE journals is often not only to meet the quality requirements of different disciplines, but also to comply to the

additional requirement of accessibility. Some journals seek IRDE perspectives because they appeal to a wider audience. To achieve both requirements is not an easy task. There is often a trade-off between quality and accessibility which successful interdisciplinary journals have managed to balance. The same situation as for the constitution of assessment committees discussed above applies to referees of interdisciplinary journals. Referees should be guided by the same interdisciplinary criteria.

A problem discussed at the workshop is that there is more written material on what IRDE should look like than on good practices of IRDE. There is a need for empirical cases and examples of IRDE studies that may contribute to identify and document challenges and viable alternatives.

Key recommendation:
Those who are actively engaged should try to establish standards of what constitute high quality IRDE research, by agreeing on clear criteria for assessment, and identifying IRDE journals of proven quality.

4.4 Assessing individual performance

Assessment of individuals can be problematic in IRDE projects. For many researchers the aim is to be strong in their own discipline. Some might feel that doing IRDE will cause them to lose their disciplinary identity – either as they themselves experience it, or as others classify them. Paradoxically, it is through working with researchers from other disciplines that one becomes more aware of the special characteristics of one's own.

The question of labels relates to professionalisation. It might be difficult to make a career with two labels. People have inherent perceptions of disciplines, and might have difficulties dealing with academic 'hybrids'. While some would argue that there is a need to challenge the strict boundaries between the disciplines, and the 'pigeon-holing' of people into disciplines, others consider the problem of professional identity as illusory, given that researchers (like most people) do not really change identity; instead, they just move in and out of identities or are more or less associated with different identities at the same time.

Doctoral students constitute a special case, since they are subject to formal assessment in their respective disciplines, which is determinant for their future careers. Lacking interdisciplinary panels, research students are often evaluated by individuals with deep empirical knowledge, but narrow disciplinary scope. As mentioned earlier, this may lead to *double jeopardy*.

The development of interdisciplinary programs for doctoral students is another issue which was discussed at the workshop. While some students may have a solid anchor in a specific discipline that facilitates their encounter with other disciplines and the crossing of academic boundaries, those who are not in the same situation may get lost in the interface between disciplines. It is important to remember that conducting IRDE is not an aim in itself but a means to an end. Thus, the motive for developing interdisciplinary programmes for research students is to contribute interesting perspectives and new knowledge. Also, many jobs in development require knowledge from others fields of research. IRDE students *can* have academic careers - though some battles to build and consolidate spaces may be required. Experience from Sweden suggests that IRDE students are well placed to get jobs, including academic careers in university departments.

A common experience at the workshop was that the most successful students were often those who had participated in interdisciplinary programmes. The process of doing team fieldwork has in itself positive side-effects. The frictions that arise may be alarming and can make for a competitive situation, but this is at the same time rewarding.

There is a need to bring together the experiences from earlier research and to use them in establishing criteria for assessing IRDE. Something often lacking in IRDE is strong academic networks similar to the ones operating in most disciplines. This absence inhibits the passing on of experiences to younger researchers and the consolidation (or at least formulation) of common criteria for the assessment of IRDE.

Key recommendation:
Experienced IRDE researchers – perhaps linked through a network – should be used to assess whether research quality is maintained, according to shared criteria and standards.

4.5 Assessing institutions

The organisation of IRDE is important, and hence some institutions and institutional forms are more conducive than others for undertaking this type of research. Universities tend to be organised along mono-disciplinary lines, in faculties and departments, a structure that does not favour interdisciplinary research. Some universities actively promote alternative institutional forms such as 'themes' rather than faculties (like Linköping University in Sweden), interdisciplinary centres (such as SUM at the University of Oslo, Norway), and non-university research institutions (like ICIMOD in Nepal), which are freer to adopt their own organisational form. These types of institutions both encourage interdisciplinary research among their own staff, and promote a more 'IRDE-friendly' context for research in general. The assessment of an IRDE research proposal should therefore take account of the institutions concerned: whether they have an explicit mandate to undertake inter-disciplinary work; whether their organisational form is such as to actively promote interdisciplinary research; and whether they have a proven track record in undertaking other interdisciplinary research projects.

Key recommendation:
The assessment of an IRDE research proposal should also take account of the institutions concerned: their mandate, organisational form, and track record in IRDE.

4.6 Assessing relevance

In the field of IRDE, social relevance as a criterion of assessment is more highlighted than in other areas of research, mostly because of the implicit normative nature of the research topics themselves: development and environment. On the basis of the potential 'users' of the research, we can distinguish between (at least) two types of relevance of IRDE: relevance for the subjects of study (such as the local population, actors in economic sectors, organisations, etc.) and relevance for policy-makers (such as governments and international organisations). The interests of these two types may overlap in some cases, but are not necessarily the same. For example, what is relevant research for a specific industrial sector might also be for a ministry of environment in a given country, but not necessarily for an international donor agency.

In assessing social relevance, it is necessary to be aware of the potential tension between this and academic quality. Increasingly, research funding agencies make use of their resources on the basis of priorities established through framework programmes, which include the relevance criterion. For IRDE, it is not enough that proposals are of high quality, they also have to meet the demands for social relevance either for the subjects of research or for policy-making.

This inevitably creates a tension, to which IRDE researchers are well accustomed. An appropriate response is one of "committed scholarship", in other words a critical but engaged attitude to policy-making on the part of researchers. This important issue is discussed in more detail in the next chapter.

Key recommendation:
Be aware of the tension between social relevance and academic quality. A good IRDE project should meet both requirements, not only one at the expense of the other.

5. Policy and Politics

It is often expected that IRDE should be policy relevant, to a greater extent than other research (ref. Chapter 4). This chapter is concerned not only with the use made of IRDE – the link between IRDE and policy – but also with the politics of IRDE, an issue of which researchers doing IRDE tend to be very aware.

Some would claim that all research should concern issues of importance to society at large, and have implications for change and reform; that researchers should strive for greater advocacy in research, focus on target groups, and ask who will benefit from the research. Certainly this view is especially strong among those working in the field of development and the environment. And perhaps this is especially so in the South, where researchers feel pressure to make a constructive contribution to policy and public consensus building. But the relationship between researchers and activists/lobbyists is often strained.

There was a general agreement at the workshop that if policy is to be successful, it is necessary to have a broad and interdisciplinary perspective on the issue in question. IRDE seems to be well equipped to be policy-relevant.

5.1 Research and policy: Is there a conflict?

Whether there is a conflict between policy relevance and academic quality is a question on which views differed among the participants at the workshop. But it was agreed that the academic quality of IRDE should be assessed in its own terms, not in mono-disciplinary terms (see previous chapter). It was also argued that a piece of research can be used both as the basis for writing an article in an academic journal and for writing a report for policy-makers, but that these different types of product should be assessed according to different criteria.

That there is a gap between research results and implementation, and that there tend to be conflicts between researchers and policy makers was generally agreed. Opinions differed as to whether researchers should provide specific policy recommendations, but there was agreement on the need to make the consequences of different policy options more visible to policy makers and provide them with such different options. Not only may researchers and

policy-makers have different perspectives on what constitutes a problem, they have different priorities in other respects. For example, they may have very different time horizons, with policy makers unwilling to engage in long-term projects and long-term studies. Sometimes researchers may find themselves serving as the 'buffers' between local people and technical experts who place little value on indigenous environmental knowledge (see **Box 16** and **Box 17**).

Box 16: Indigenous environmental knowledge

Indigenous knowledge (IK) was neglected in development work prior to 1980. The reasons are several: prejudices and misconceptions regarding its scientific value, the hegemony of top-down project planning and the conception that 'West is best'. In addition, consultancy and project organisation has often not allowed sufficient time or space for effective recording of IK. Since 1980, however, there has been a rapid growth in IK advocacy. The change in attitude towards IK has been influenced by the failure of top-down approaches (both nationally and internationally); by the environmental movement; by increased understanding of the linkage between biological and cultural diversity; through political emphasis on the human factor, gender, local input and participatory approaches; by effective and passionate lobbying by individual scholars (e.g. Warren, Chambers, Prance); by international agreements and legal frameworks (e.g. CBD); and finally, through scientific and commercial interests (e.g. ethnobotanical screening).

The renewed interest in IK advocacy has resulted in serious and productive interdisciplinary research; retraining in another discipline; and in more effective planning and problem-solving. But there are also hazards, for example regarding definition of terms and concepts; romanticisation and aestheticization of traditional knowledge; a crisis of expectations in what it can achieve; and mechanistic rather than contextualised interpretations. In general, it is necessary to separate ideologically-driven commitment from demonstrated relevance, not to trivialise the use of participatory approaches, to identify potential legal and ethical issues, and to recognise the dangers of reifying IK, as well of the problems of hybridity and translateability. It is necessary to plan projects in a way which allows local people the freedom to make choices between the traditional and the modern based on their own experience. There is a need to focus on both technical knowledge and social contexts. Anthropologists need to be more realistic, and scientists more anthropological.

Source: Ellen, R. 2000. Interdisciplinary research on Indigenous Environmental Knowledge. In *IRDE Workshop: Short notes on interdisciplinarity.*

5.2 The Politics of IRDE

In this, as in many other arenas, the issues of unequal power and status arise. Many dimensions may be listed, e.g. between:

- 'hard' sciences, 'hard social sciences', and 'soft social sciences' (in academia);
- researchers and funding agencies;
- North and South (both researchers and decision-makers);
- researchers and lobbyists (NGOs);
- decision-makers and 'the people'.

This is in addition to other dimensions that are more general and often apply here also, e.g.

- male and female
- younger and older generation

And some of these are linked to each other: for example, gender issues are often regarded as the domain of female researchers, and classified as 'soft social science'.

Some policy actions like the participatory approach have led to collaboration between disciplines, thus easing possible tensions among them. For instance, the Participatory Rural Appraisal (PRA) can be seen as an antidote to technocratic 'positivism'; but economics is not well equipped to combine with PRA.

Here also money brings power – and maybe status. Participants discussed whether alternative organisational/financing models might change these relationships, in order to make a more even distribution of resources among research institutions. It was noted that in numerical terms there was some kind of northern bias in the group, and, perhaps for this reason, there was a particular focus on how to fund IRDE projects.

Box 17: Applied Action Research on the Orang Asli of Malaysia

There is an acute need for conservation of indigenous land and forest resources. However, conservation of socio-biological and cultural diversity of the lifestyles and economic activities of the *Orang Asli* is not a priority of the Malaysian government. Such projects are usually seen as not feasible or contrary to government efforts to 'mainstream' and 'develop' them into worthy citizens of the country.

As a result, the *Orang Asli* are being driven more and more to join international global indigenous networks for empowerment. *Orang Asli* leaders themselves need more political knowledge to uphold indigenous rights and autonomy and the women need more training to be financially independent of men to prepare themselves for the inevitability that dependency on men who continue to be dependent on forest resources may be a short lived institution.

Source: Wazir, K. 2000. Notes on interdisciplinarity. In *IRDE Workshop: Short notes on interdisciplinarity.*

5.3 Disciplines and policy

Participants discussed the differing characteristics of disciplines, and especially those represented at the workshop. Economics was particularly focused upon, often unfavourably (see Chapter 2.5). Some claim that in social sciences and development studies the main problem for interdisciplinary research is with economics, and economists. The lure of economics – the promise of combining the joys of science with the pleasures of social relevance – makes it attractive to policy makers. There was discussion also of the privileged relationship that economics enjoys in this respect. Economics is the discipline which has most influenced policy. What makes economics well equipped is its tools, the modelling of policy, a language that relates to policy, a focus on policy instruments. Thus, in a sense, economists take policy seriously. Also it is more prestigious among economists to influence policy-making, by comparison with anthropologists or sociologists.

In Chapter 1 (Box 3) three contrasting approaches to policy were identified: the technocratic, the critical and the populist. Economics as a discipline is particularly associated with the first, where social science is sought 'applied' in much the same way as natural science is 'applied' through technology. The approach includes preparation of guidelines, manuals, and methodologies such as cost-benefit analysis. The concept of the 'expert system' is at the heart of this approach; that somehow the knowledge and experience of the researcher can be distilled out, and then applied. This view is challenged both by researchers from other disciplines and also non-researchers.

Perhaps there is now a space for dialogue between economists and researchers from other disciplines. Failures of mainstream economics in several major areas (such as structural adjustment programmes in Africa, privatisation in Russia, and the East Asian financial crisis) have in many respects opened a window of opportunity for interdisciplinarity. If researchers from other disciplines are able and willing to engage in policy issues, it may be possible both to increase collaboration between disciplines and draw on their combined expertise in helping to resolve pressing problems of poverty and environmental degradation.

6. Some Key Conclusions

It emerged clearly and strongly that the participants at the workshop are committed to IRDE. They share the view that an interdisciplinary approach is crucially important for undertaking research on development and environment, but they are also aware of the challenges facing IRDE.

Planning, conducting and assessing IRDE involve complex issues that have been discussed throughout this report. Although Chapters 3 and 4 identify a number of key recommendations, we will not attempt here to suggest a blue-print of how to do 'good IRDE'. Indeed, such broad generalisations would be contrary to many of the views expressed by the participants at the workshop. Our collective effort allows us however to arrive at the following conclusions:

- IRDE challenges the dominance of a mono-disciplinary approach in general, and of some disciplines in particular – especially those with a more positivistic and reductionist approach.

- IRDE challenges the dominance of a technocratic/bureaucratic approach to policy-making, which assumes that the latter consists merely of translating expert knowledge into practice, by the use of selected instruments.

- There is a need to bring about changes – both in the research arena and the policy arena, and not least at the interface between the two. Some of these are very basic, structural changes that will not be achieved easily or rapidly. Some of the necessary changes challenge deep-seated worldviews and institutional structures; and some challenge individual or collective interests.

- This report provides a preliminary framework for identifying and understanding some of these issues, and makes some specific proposals for action. It also identifies the need for research *on* policy. One means of doing this is to study a range of case studies, analysed according to a more developed version of the typology outlined in Chapter 2, so as to draw out more well-founded and applicable lessons learned.

The workshop participants strongly emphasised the value of bringing together experienced and like-minded researchers in IRDE. A discipline has been described as both a social and a cognitive phenomenon; and in the same way, those working on IRDE – although not constituting a discipline – recognise that progress may be made through developing a collective identity, with shared values, concepts and standards. More specifically, this may involve further developing a community of IRDE: through networks of individuals and institutions, and activities such as student and staff exchanges and specialised doctoral courses; exchange of views and information about relevant journals and publications, workshops and conferences, etc. The workshop was seen as a significant step in building such a community of like-minded researchers.

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Annex I: Some key journals in environment and development

- AMBIO: Journal of the human environment
- Biodiversity and Conservation
- Business Strategy and the Environment
- Ecological Economics: The journal of the international society of ecological economics
- Environment and Development Economics
- Environmental Politics
- Environmental Values
- The European Journal of Development Research
- Forum for Development Studies
- Human Ecology: An interdisciplinary journal
- International Environmental Affairs: A journal for research and policy
- Journal of Environmental Economics and Management
- Journal of Ethnobiology
- Society and Natural Resources: An international journal
- World Development

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